PART III

PHYSICAL DESCRIPTION

Physical Regions of Washington

On the basis of surface features, Washington may be divided into eight major regions. Agricultural settlement is influenced by factors of topography, climate, soil, forest vegetation and water resources distinctive to each of the physiographic regions. Each has become a different type of farming area as settlers have learned to adapt crops and livestock to the conditions, or have improved limitations through drainage or irrigation.

Coastal Plains

A narrow, sandy plain with shallow bays, tidal flats, stream deltas and low headlands lies between the coastline and the Coast Range. It extends from the Columbia River mouth almost to Cape Flattery, being widest and lowest in the Grays Harbor and Willapa Bay districts. The climate is mild and damp with a long growing season, but it is too cool, cloudy and wet for most crops. Originally, this area was covered with heavy forests but much of it is now covered with woodlands. Lumbering and manufacture of wood products is the main industry. Farming is largely livestock and dairying using the low uplands and drained areas in the lower Chehalis River Valley. Cranberry growing is important and well-adapted to numerous, boggy areas in the Grays Harbor and Willapa Bay regions. The shallow bays are also used for oyster culture. Fishing is common in the rivers and coastal banks.

Coast Range

The Coast Range is an uplifted area of sedimentary and metamorphic rocks divided into the Olympic Mountains and the Willapa Hills. The Olympics tower to nearly 8,000 feet in a dome-like structure, carved deeply by rivers. These mountains have the heaviest precipitation in the state. Snowfields and heavy forest cover the mountains. Most of the wilderness area is within the Olympic National Forest and Olympic National Park, being managed for recreation, wild-life and timber. Farm settlement is limited to some foothill river plains and coastal terraces such as the Dungeness and Port Angeles districts along the Strait of Juan de Fuca. Here in the lee of the mountains, rainfall is moderate and irrigation is practiced by some livestock farmers. The Willapa Hill country is wet, heavily forested and carved into numerous narrow valleys. Logging is the main industry, combined with livestock farming in the upper Chehalis River Valley and along the banks of the Columbia River. Wet climate, hilly topography and the difficulty of clearing stump land retards agriculture.

Willamette-Puget Sound Lowland

A broad lowland, described as a trough or valley, lies between the Coast Range and the Cascade Mountains. The northern part is the Puget Sound Lowland which has been glaciated and is occupied by the sea in the lowest sections. The continental glacier reached slightly south of Olympia. Under a warming climate it melted and geologists believe it receded about 25,000 years ago, leaving an infertile plain of moraines and outwash gravels, sands and clays known today as the Puget Glacial Drift Plain. Its rolling surface has numerous lakes and bogs.

Most of the major cities--Seattle, Tacoma, Everett, Bellingham and Olympia--have been built on moraines bordering the Sound. Rivers such as the Nooksack, Skagit, Snoqualmie, White and Puyallup have built up deltas and floodplains over the older gravelly plains. These narrow valleys are more fertile than the older glacial plains and support numerous small dairy, vegetable and berry farms. Most of the gravelly areas are wooded with a second-growth forest and are used for pastures. In the southern part of the Willamette-Puget Sound Lowland there are two large valleys--the Cowlitz and Chehalis. They drain a low, hilly area with several flat prairies and bottomlands.

Agriculture is handicapped by poor drainage and flooding of the river deltas and plains, by heavy, winter rainfall, by cloudy but dry summers, by coarse, gravelly upland soils and by densely wooded land which is costly to clear. Advantages are mild climate and a location close to major markets for farm products such as milk, poultry and vegetables.

Cascade Mountains

The Cascades are a wide and high topographic and climatic barrier which separates western and eastern Washington. The range is made up of sedimentary, igneous and metamorphic rocks which have been carved by glaciers and streams. High, isolated volcanic cones of lava such as Mt. Adams (12,307 feet), Mt. Rainier (14,408 feet) and Mt. Baker (10,791 feet), appear upon the older Cascade rocks. The Cascade crest varies between 10,000 and 3,000 feet and is higher and more rugged in northern Washington. Roads and railroads have been built across its lower passes in central and southern Washington. The Columbia River has cut a deep gorge and the lowest pass through the barrier. The western slope is wet and heavily forested with Douglas fir; the eastern slope is drier with a less-dense pine forest. Nearly all classified as forest land, most of the area is in Federal ownership in five national forests and Mount Rainier National Park. Tree fruit farming in the eastern slope valleys of Wenatchee, Chelan, Methow, Naches and the Columbia Gorge is most important. Sheep and cattle summer grazing on alpine grasslands is another use. Deep, western slope valley bottoms such as the Skagit, Snoqualmie, Nisqually, Cowlitz and Lewis also contain livestock farms. The area is vitally important as a watershed for irrigation and city drinking water and as a source of timber. Steep terrain, wet climate, short growing seasons and heavy forest vegetation are main handicaps for agriculture.

Columbia Basin

A low plateau of old lava rocks covered with stream and wind-deposited soils extends in a series of plains, ridges, coulees and hills from the Cascades to the eastern Washington border. The area is basin-like in structure, being higher around its margins and sloping inward to low and level central plains. It has been sharply eroded by the Columbia River and its interior tributaries--the Snake, Yakima, Palouse and Spokane Rivers. The basin has several sub-areas created by crustal movements and erosion.

A. The Yakima Folds are a series of hilly ridges extending from the Cascades eastward into the lower part of the basin. The Yakima and Columbia Rivers have cut gaps through the ridges and have built up plains in the troughs between them. The rich, alluvial plain of the Yakima River is an important irrigated valley.

B. The Waterville Plateau is a tableland of thin soils overlaying basaltic rock at an elevation of 2,500 to 3,000 feet. It has gorges cut by the Columbia River and ancient glacial outwash streams once flowing in Moses and Grand Coulees. It is too high for irrigation and is used for dryland grain and livestock farming.

C. The Channelled Scablands is a belt of dry terrain carved by ice-age rivers into a series of coulees. Bare rock is exposed in the coulees. Small plateaus between the old river channels have thin soils used for dryland farming. The Grand Coulee of this region has been developed into a major irrigation reservoir.

D. The Palouse Hills consist of fertile deposits of wind-blown soil overlaying basaltic lava flows. After being deposited in large dunes, the formation was reshaped by streams into an intricate pattern of low, rounded hills. The hills receive 16 to 25 inches of rainfall annually and have deep, porous and fertile soils. It is one of the richest farming areas of the Pacific Northwest.

E. The Central Plains are low and relatively level expanses of soil, deposited by old streams crossing the Channelled Scablands and later by the flooding of the Yakima, Columbia, Snake and Walla Walla Rivers. Climate is desert-like (6-12 inches of precipitation per year). The lower lands of the area, the Quincy and Pasco Basins and the Walla Walla Valley, are irrigated. The Quincy Basin is a new irrigation area watered by Grand Coulee Dam.

Agricultural handicaps in Columbia Basin regions are mainly found in its dry, continental climate. Large irrigation systems built since 1900 have overcome much of the need for water on rich valley and basin soils. Dryland farming in higher areas is practiced widely, although occasional variations in rainfall, lack of snowfall, winterkill, water and wind erosion inflict damage to field crops and to livestock ranges.

Okanogan Highlands

A portion of the Rocky Mountains, consisting of well-eroded, old granites, lavas and sedimentary rocks extends across north-central Washington. These are the Okanogan Highlands, the state's richest mineral area. Summit levels reach 4,000 to 5,000 feet with peaks exceeding 7,000 feet. Prominent north-south valleys are occupied by irrigated tree fruit and livestock farms. These are the Okanogan, Sanpoil, Kettle and Colville Valleys. The Columbia River Gorge through the Okanogan Highlands is occupied by the large man-made lake behind Grand Coulee Dam--Roosevelt Lake. Higher and wetter portions are forested with pine and larch, and are managed for timber and for livestock ranges by the United States Forest Service and the Bureau of Indian Affairs. Cold winter temperatures, short growing seasons, dry valley climates and remoteness from markets are farming handicaps.

Selkirk Mountains

The Selkirks, a range of the Rocky Mountain system, extend into the northeast corner of Washington. The rocks are old, mineralized granites and metamorphics reaching elevations of over 7,000 feet. The Pend Oreille River Valley at the base of the Selkirks is an agricultural area of narrow bottomlands settled by livestock

farmers. Nearly all of the uplands are in Kaniksu National Forest. While climate is cool and growing seasons are short, the Pend Oreille Valley has an advantage of being relatively in close proximity to the Spokane metropolitan market area.

Blue Mountains

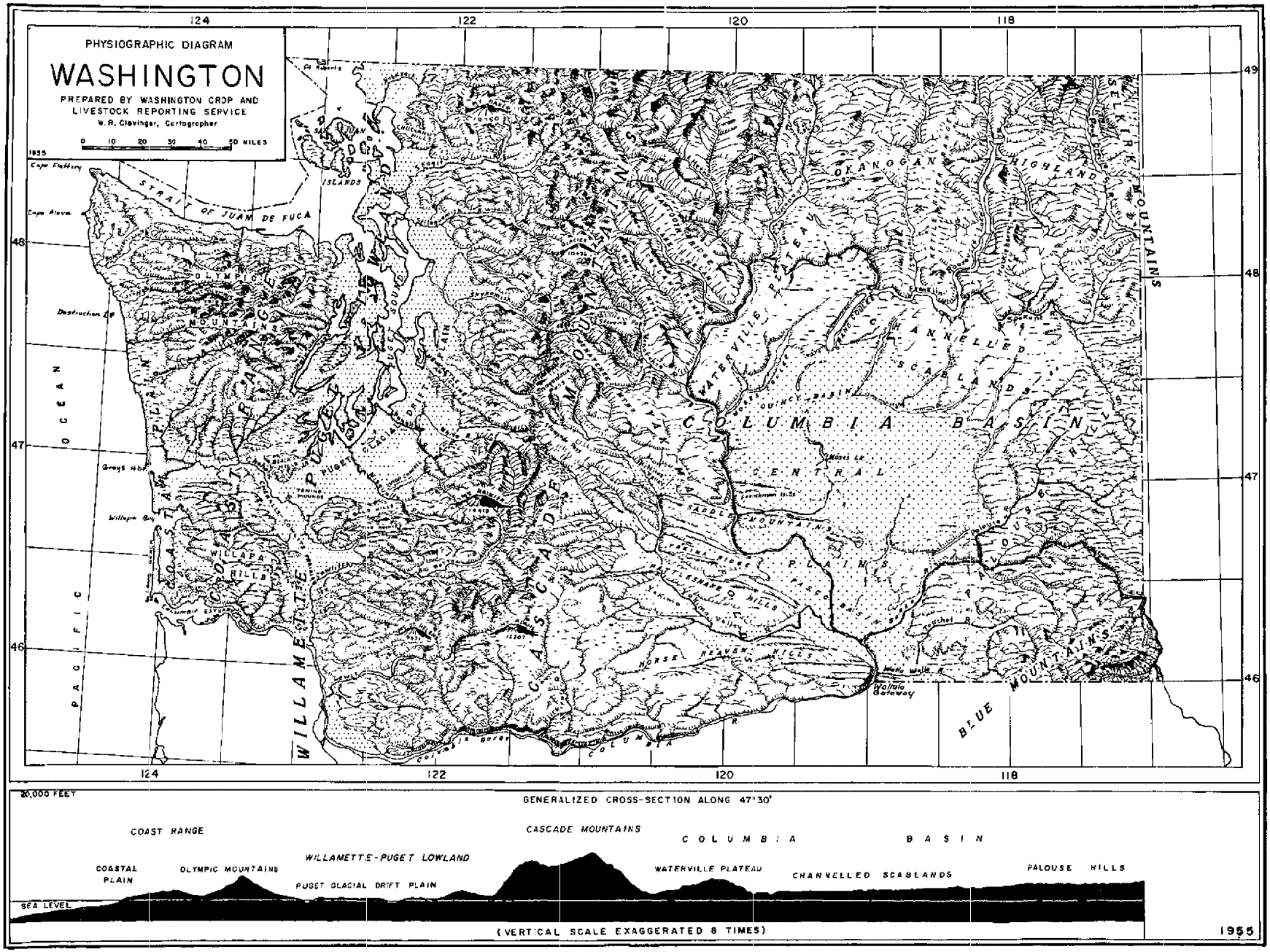
The Blue Mountains are an uplifted and eroded plateau extending into the southeastern corner of Washington. The strata are mainly ancient crystalline rocks which contain some minerals. The highest point of the mountains in the Washington section is Diamond Peak (6,401 feet) located on the divide between the Grande Ronde, Tucannon and Touchet Rivers. These rivers, and the Walla Walla River, have cut valleys into the plateau. Extensive pine forest and grassland areas are in the highlands within Umatilla National Forest, where rainfall is 30 to 40 inches. The Snake River has cut a deep valley and gorge across the lower parts of the mountains. The area is well developed agriculturally around its northern foothills where wind-blown soils are deep and irrigation systems are used. The Walla Walla and Tucannon Valleys are rich grain, legume and livestock areas of irrigation and dry farming. Grazing is an important use of the highlands by livestock ranchers in the upper valleys.

Topography of Yakima County

Three distinct types of physiographic features characterize the general topography of Yakima County. The first is the Cascade Mountain section with its high volcanic peak, Mount Adams, in the western half of the area. Two passes, White Pass (4,500 feet) and Chinook Pass (5,440 feet) breach the Cascade barrier with two cross-state highways in Yakima County. Mount Adams (12,307 feet), which is perpetually ice-covered, is the second highest mountain in the state. Its last, prehistoric eruptions threw pumice stone and volcanic ash over the basaltic plateau sloping eastward to the Yakima Valley.

The second is the series of ridges belonging to the upfolded landforms called the Yakima Folds which extend eastward from the Cascades into the plains and the low plateau of the Columbia Basin. Apparently these ridges were uplifted slowly across the Yakima River channel and in this process the Yakima cut gaps through them such as Union Gap in the Ahtanum Ridge-Rattlesnake Hills fold. Other folded structures consist of the Umtanum Ridge, Yakima Ridge, Toppenish Ridge and Horse Heaven Hills. These form a large area of rounded, sagebrush-covered hills to the north and south of the Yakima River.

The third region is the broad, alluvial plains and terraces formed by the meandering and flooding of the Yakima River through many centuries and are now the major sites of inhabited and cultivated lands. The irrigable plains have a gentle slope from Naches southeastward to Grandview and Mabton. Long irrigation canals diverting Yakima River water follow the contours of the terraces which slope gently toward the Yakima River flood channel while secondary ditches flow down the terrace slopes. The elevations of the valley lands range from 1,500 feet at Naches to 800 at Grandview. The Yakima River in its channel is slightly lower, being 1,450 feet at Naches and 500 feet at the Benton County line. Alluvial plains of gentle slope are also in the lower reaches of the small tributaries such as the Naches River, Toppenish Creek and Satus Creek.


PHYSIOGRAPHIC DIAGRAM
WASHINGTON
PREPARED BY WASHINGTON CROP AND LIVESTOCK REPORTING SERVICE
W.R. Clevinger, Cartographer
0 10 20 30 40 50 MILES
1955
124
122
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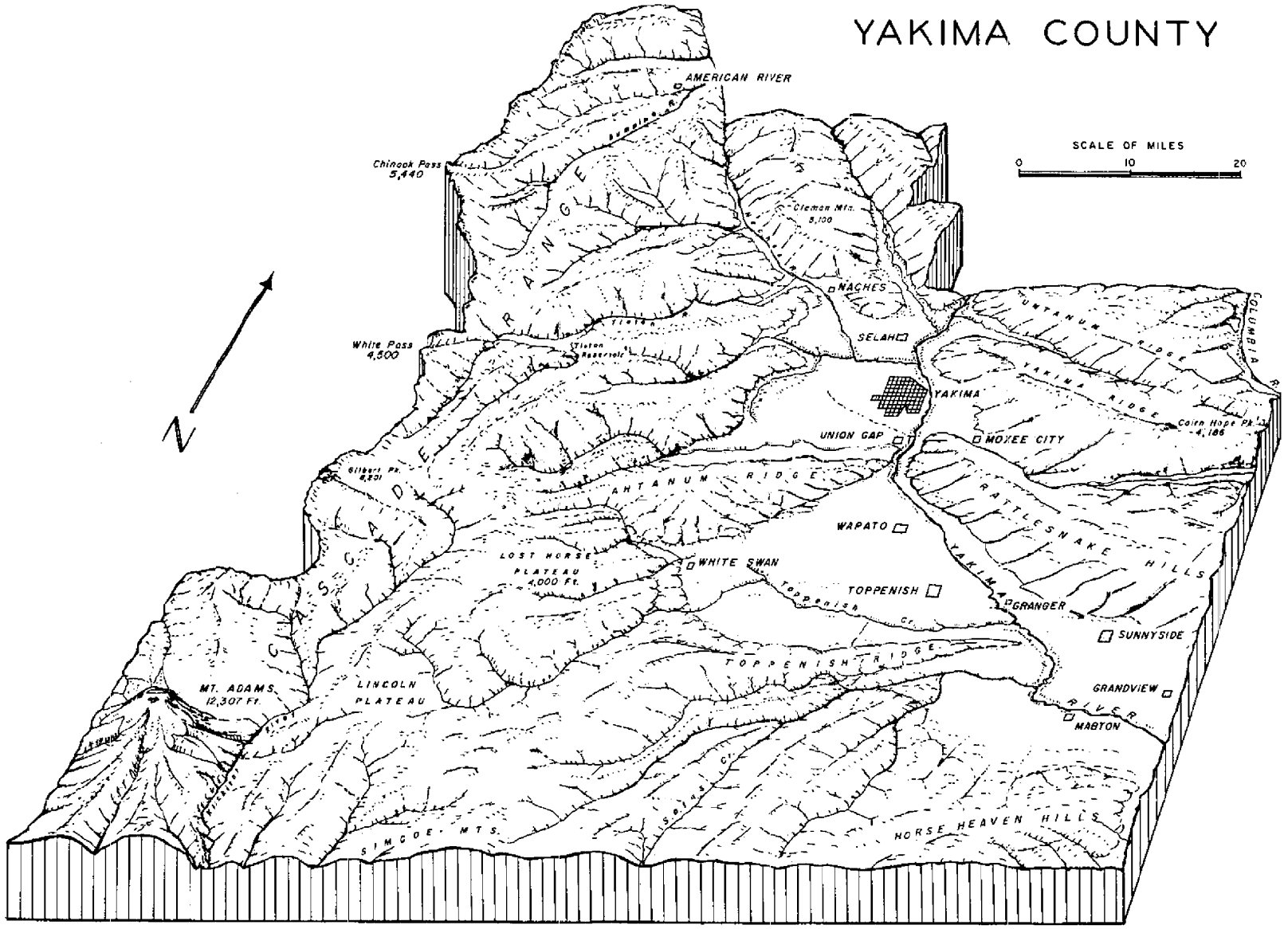
PACIFIC OCEAN
STRAIT OF JUAN DE FUCA
OLYMPIC MOUNTAINS
COASTAL PLAIN
WILLAPA HILLS
PUGET SOUND
PUGET GLACIAL DRIFT PLAIN
WILLAMETTE-PUGET LOWLAND
CASCADE MOUNTAINS
OKANOGAN HIGHLAND
SELKIRK MOUNTAINS
WATERVILLE PLATEAU
CHANNELLED SCABLANDS
COLUMBIA BASIN
CENTRAL PLAINS
PALOUSE HILLS
BLUE MOUNTAINS
COLUMBIA R.
20,000 FEET
GENERALIZED CROSS-SECTION ALONG 47°30'
COAST RANGE
CASCADE MOUNTAINS
COLUMBIA BASIN
COASTAL PLAIN
OLYMPIC MOUNTAINS
WILLAMETTE-PUGET LOWLAND
PUGET GLACIAL DRIFT PLAIN
WATERVILLE PLATEAU
CHANNELLED SCABLANDS
PALOUSE HILLS
SEA LEVEL
(VERTICAL SCALE EXAGGERATED 8 TIMES)
1955

TOPOGRAPHIC DIAGRAM

YAKIMA COUNTY



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W.R. CLEVINGER.

Climate

The relation of climate and weather to agriculture is very important as it is almost the ultimate determinant of what shall be grown. Yakima County has a continental climate which is hot and dry in the summer and relatively mild and moist in the winter. Laying partly on the eastern slopes of the Cascade Range, the climate is varied and greatly influenced by the mountains which act as a barrier to the moist, prevailing westerly winds. The rise of air over this range and its drying, downward flow into the Yakima Valley, create temperature and moisture conditions that have influenced the types of crops and farming. Dryness caused by the descending air, and the heat from the summer sun prompted early cattlemen and pioneers to call the Yakima Valley lowlands a desert. Effects of land contour on the atmospheric circulation make the lower Yakima Valley one of the driest sections of the state. Precipitation varies here from 8 to less than 7 inches per year. Climatic conditions in the valley compelled the earliest settlers to resort to irrigation to grow foodstuffs.

Throughout the Yakima Valley, the average temperature during the warmest months ranges from 80 to 90 degrees and the nighttime temperatures from 50 to 60 degrees. Heat extremes to 112 degrees have been recorded and occasionally crops are damaged by hot, dry winds. Temperatures in the highlands are 5 to 15 degrees cooler and decrease considerably from east to west with increase in elevation along the Cascade slope.

Winters are cold with freezing temperatures and snowfall occurs in both the high and low elevations. The average maximum temperature for the valley lowlands in the coldest month ranges from 2 to 6 degrees above freezing. Average minimum temperatures range from 18 to 22 degrees. During a few cold winters, temperatures have dropped to a -10 degrees or lower. Winter extremes of 10 to 25 degrees below zero have been recorded in the Valley from Naches to Sunnyside. Temperatures in the mountainous western section of the county are generally the coldest, while the Yakima Valley is the warmest.

Growing season in the Yakima Valley is generally from April 15 to October 15, a total of 180 days. Many fruit farmers, however, are prepared for frosts with smudging equipment. Plant covers are used to protect frost-sensitive vegetables early in the season. The risk of freezing temperatures at selected locations in Yakima County is given in Table 5.

Chinook winds, warmed by air flowing down the eastern slope of the Cascades, are a feature of the climate which benefits orchards and other crops in early spring. Mild Pacific Ocean air of about 40 degrees reaches the Cascade crest and drops to a temperature of 25 to 30 degrees at the 7,000 to 8,000 foot elevation. As the air descends the eastern slope into the Yakima Valley, it is warmed by the physical process of compression. A cubic foot of air will be warmed about 5 degrees for each thousand feet of descent. When this air reaches the Yakima Valley it may have warmed to 50 to 55 degrees. The atmosphere is clear and soil moisture is evaporated rapidly.

The precipitation pattern varies considerably with changes in altitude from the Cascade summit to the Columbia River. The Cascade highland section in the western third of the county is moist, receiving about 80 inches at the Cascade divide to 20 inches in the lower eastern slope foothills. Precipitation diminishes rapidly from west to east on the slope. The descending westerly air warms,

Table 4. Temperature Data
Average Maximum, Average Minimum, Mean, Highest and Lowest Temperature Each Month
Yakima County, 1930-1960

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
Bumping Lake (3440 elev.)	Av. Max.	33.8	38.3	42.6	50.7	59.0	64.4	74.3	74.7	68.5	56.9	42.0	33.8	53.3
	Av. Min.	12.3	14.6	19.1	25.4	32.2	37.4	42.0	40.7	35.2	29.1	22.5	19.3	27.5
	Mean	23.1	26.5	30.9	38.1	45.6	50.9	58.2	57.7	51.9	43.0	32.3	26.6	40.4
	Highest	55	60	73	80	88	93	101	97	94	85	66	61	101
	Lowest	-38	-35	-18	-3	13	22	27	24	18	-5	-12	-16	-38
Yakima (1061 elev.)	Av. Max.	36.5	44.7	45.3	65.8	74.1	80.0	88.9	86.5	78.8	65.6	48.1	39.7	63.7
	Av. Min.	18.5	23.2	28.7	35.2	42.8	48.8	53.1	50.6	43.8	35.4	26.7	23.3	35.8
	Mean	27.5	34.0	42.0	50.5	58.5	64.4	71.0	68.6	61.3	50.5	37.4	31.5	49.8
	Highest	64	69	80	88	98	103	105	102	100	85	70	62	105
	Lowest	-21	-25	-1	21	25	33	35	35	29	17	-3	-2	-25
Sunnyside (747 elev.)	Av. Max.	38.6	46.5	57.4	67.5	75.7	81.6	90.1	88.1	80.4	67.3	50.0	41.4	65.4
	Av. Min.	21.8	25.5	31.0	37.7	45.3	50.8	54.1	51.3	45.9	37.9	29.3	26.2	38.1
	Mean	30.2	36.0	44.2	52.6	60.5	66.2	72.1	69.7	63.2	52.6	39.7	33.8	51.7
	Highest	66	71	82	93	101	103	112	103	99	88	75	66	112
	Lowest	-20	-19	8	16	28	34	39	37	29	14	0	-5	-20

Source: U. S. Weather Bureau, Climatological Office.

Table 5. Probability of Freezing Temperatures -- Yakima County 1/

STATION	TEMP. (° F.)	PROBABILITY — SPRING				PROBABILITY — FALL					Growing Season Mean Length (Days)
		90%	75%	50%	25%	10%	10%	25%	50%	75%	90%	
Yakima	32	Apr 3	Apr 15	Apr 28	May 12	May 24	Sep 19	Sep 30	Oct 12	Oct 25	Nov 5	167
	28	Mar 16	Mar 28	Apr 9	Apr 23	May 6	Sep 28	Oct 9	Oct 21	Nov 2	Nov 12	194
	24	Feb 21	Mar 5	Mar 18	Apr 2	Apr 12	Oct 13	Oct 24	Nov 5	Nov 18	Nov 26	232
	20	Jan 24	Feb 6	Feb 20	Mar 5	Mar 17	Oct 21	Nov 1	Nov 13	Nov 27	Dec 13	266
	16	—	Jan 13	Feb 2	Feb 17	Mar 2	Nov 14	Nov 25	Dec 10	Dec 31	—	311
Wapato	32	Mar 22	Apr 3	Apr 16	Apr 30	May 12	Sep 21	Oct 1	Oct 14	Oct 26	Nov 6	181
	28	Mar 8	Mar 20	Apr 3	Apr 16	Apr 28	Oct 6	Oct 17	Oct 29	Nov 10	Nov 21	209
	24	Feb 15	Feb 26	Mar 12	Mar 25	Apr 6	Oct 13	Oct 24	Nov 5	Nov 17	Nov 28	238
	20	Jan 21	Feb 11	Feb 25	Mar 10	Mar 23	Nov 4	Nov 15	Nov 29	Dec 15	—	277
	16	—	Jan 12	Feb 3	Feb 18	Mar 3	Nov 16	Nov 28	Dec 15	—	—	315
Sunnyside	32	Apr 10	Apr 23	May 6	May 19	May 31	Sep 10	Sep 20	Oct 3	Oct 15	Oct 26	150
	28	Mar 22	Apr 3	Apr 16	May 1	May 11	Sep 30	Oct 11	Oct 23	Nov 4	Nov 15	190
	24	Mar 2	Mar 14	Mar 27	Apr 8	Apr 21	Oct 8	Oct 19	Oct 31	Nov 12	Nov 23	218
	20	Feb 6	Feb 20	Mar 6	Mar 19	Mar 31	Oct 27	Nov 7	Nov 19	Dec 2	Dec 14	258
	16	—	Jan 17	Feb 6	Feb 20	Mar 4	Nov 13	Nov 23	Dec 8	—	—	305

Source: U. S. Weather Bureau, Climatological Office.

1/ To illustrate the data in the table, we find that the 50 percent probability of a 32° spring freeze for Yakima is April 28. But there is also a 25 percent chance (1 year in 4) that a 32° freeze will occur as late as May 12, and a 10 percent chance as late as May 24.

Table 6. Precipitation - Yakima County

Station	Elevation (ft.)	Period of Record	Average Annual	Greatest Annual	Least Annual	Greatest Monthly	Least Monthly	Greatest Daily
Bumping Lake	3,440	1931-60	47.82	68.70	26.35	27.69	T	3.92
Yakima	1,061	1931-60	7.86	11.87	4.02	3.25	0	1.27
Wapato	850	1931-60	7.11	11.21	3.04	3.56	0	1.36
Sunnyside	747	1931-60	6.90	10.94	3.93	2.65	0	1.12

Source: U. S. Weather Bureau, Climatological Office.

becomes less cloudy and evaporates ground moisture rapidly. Bumping Lake, at 3,440 feet, records an average of 47.82 inches. The heavy rain and snow in the mountains is essential as the source of irrigation water. Climate is arid and desert-like in the lowlands of the Yakima Valley and the hills and ridges of the eastern half of the county. Sunnyside is the driest station, receiving an average of only 6.90 inches of precipitation per year. Wapato and Yakima have less than eight inches annually. Arid conditions are accompanied by a high percentage of sunshine and considerable summer season heat. Lack of cloud cover and atmospheric moisture permits ground heat to escape at night, and like other desert climates, the evenings and nights are cool.

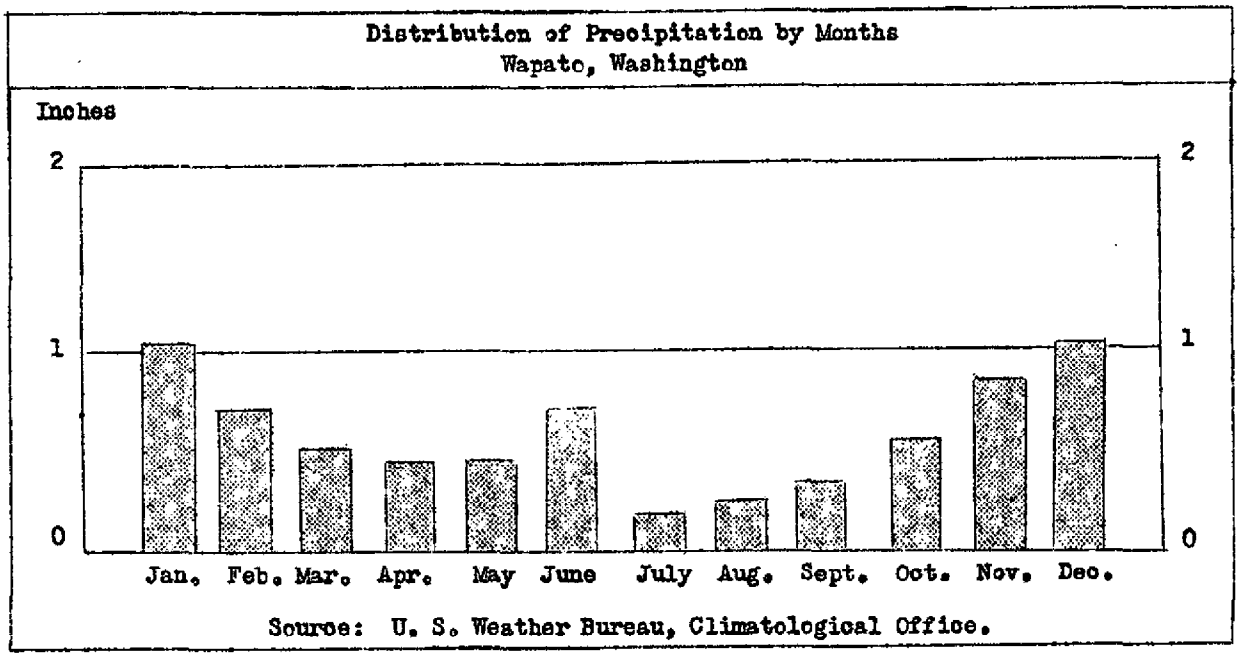

Figure 5. A graph of the rainfall at Wapato, Washington shows a dry climate in which the growing season from March to November is slightly drier than the winter period from the end of October through February. Irrigation is required during the growing season.

Maximum precipitation occurs in the winter months. Only fractions of an inch are received from April through October. There is some thunder-shower activity during the summer in the foothills and mountains. Most rainfall results from the passage of North Pacific westerly storms during the winter. Irrigation is essential for all crops in the valley.

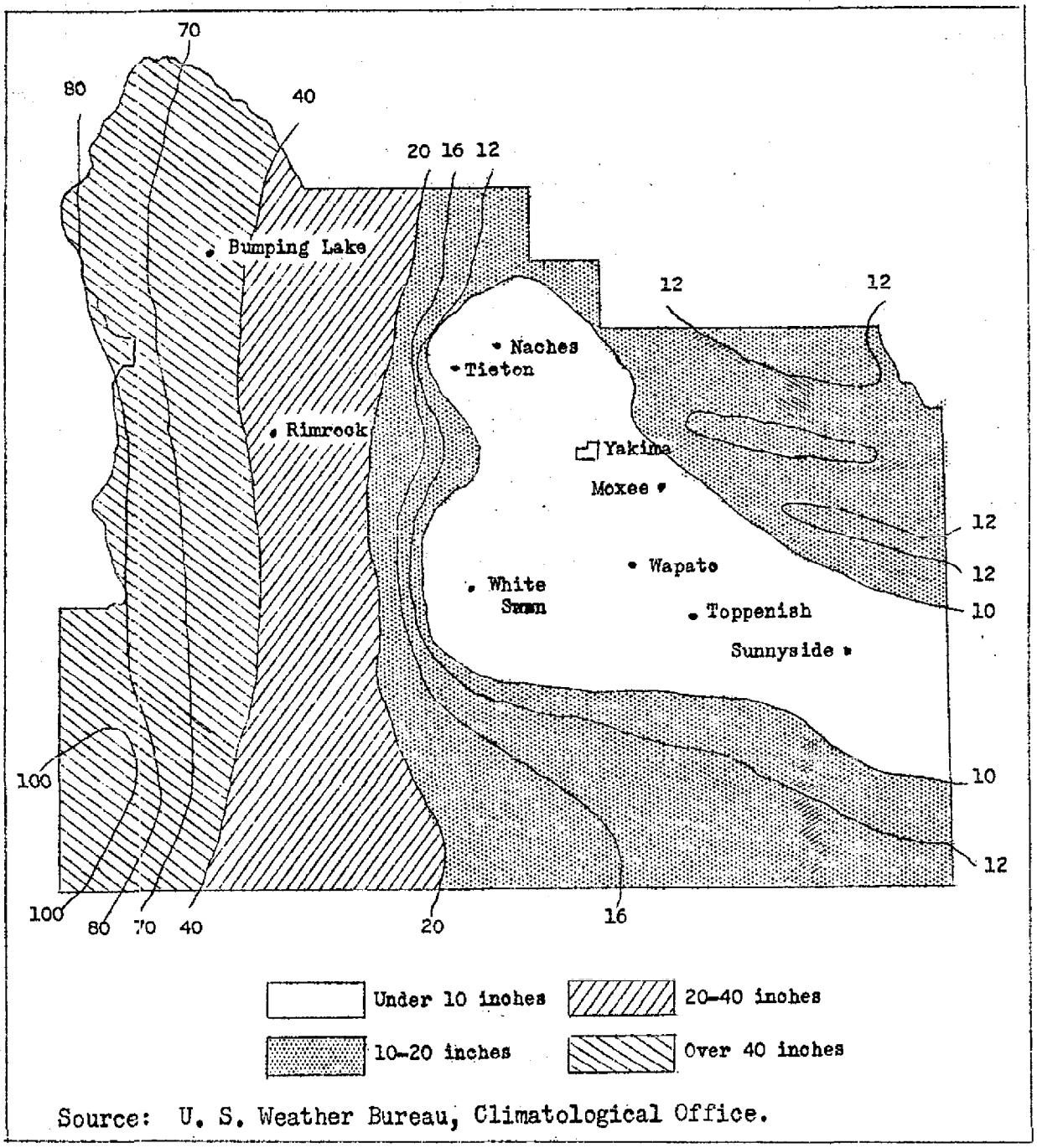

Figure 6. Distribution of Precipitation
Yakima County

Vegetation, Forests and Wildlife

Because of the wide variations of altitude, temperature and soil moisture, natural vegetation is diverse. The eastern dry section is of the steppe and desert type. Sage, short bunch grass and treeless landscapes are characteristic. Along the courses of erratic streams (streams which flow during winter wet season) pioneers found small woodlands of willow and cottonwood, oats and meadows of wild rye grass. Progressing westward up the eastern slopes of the Cascade Mountains,

conditions change rapidly from a thin to dense coniferous forest of pines, larches and firs. Extensive alpine grasslands and fields of huckleberries grow near the summit of the range. The western half of the county is classified as forest land of the ponderosa pine type.

Surveys by the U. S. Forest Service show Yakima to be an important forest resource county 1/. About 35.5 percent of the county area, or 970,000 acres, is growing commercial forests; another 6.5 percent, 177,000 acres, is noncommercial forest of small subalpine trees, rocky areas and scrub-oak woodlands. Through partial-cutting and selective logging, about 175,000 acres of the timber have been used by the lumber industry. In 1955, there was an estimated reserve of live sawtimber containing 15,277,000,000 board feet.

Commercial timber in Yakima County is composed of several main species. Ponderosa pine is the most common, totaling 5,994 million board feet. Douglas fir amounts to 3,236 million feet. True firs (Pacific silver fir, white and subalpine fir) are estimated at 2,769 million feet. There are 1,157 million feet of western larch and 2,121 feet of other coniferous species.

The Yakima Indians own nearly half of the commercial forest land. The Yakima Reservation includes 455,000 acres of sawtimber of which 41,000 acres have been logged selectively. Federal ownership in two national forests consists of 321,000 acres. About 292,000 acres are in Snoqualmie National Forest in the northeastern corner of the county. In Gifford Pinchot National Forest surrounding the Mount Adams District of the Cascade Range there are 29,000 acres. Other public ownership includes 70,000 acres of state timber land. In all, 87 percent of Yakima timber is in Indian, federal and state ownership.

The mountainous, forested land of Yakima County provides four important activities beneficial to the total agricultural economy. These include lumbering and forest-protection employment, irrigation watershed management and management for grazing, recreation and wildlife.

All major irrigation systems draw water from the streams which have their sources in the forests of Snoqualmie National Forest and the Yakima Indian Reservation. The Naches and Tieton Rivers head in the snowfields of Snoqualmie. Toppenish and Satus Creeks head in the forested highlands of the Reservation.

Timber furnishes considerable off-the-farm work for Indians and white farmers in the upper reahces of the Yakima River drainage. The cut for 1962 in Yakima County was 165,009,000 board feet from lands under all ownerships, an increase from 137,406,000 board feet cut in 1961. The 1962 timber harvest was from 24,837 acres compared with 26,411 acres the preceding year. A surprising amount of timber comes from small woodlands owned by farmers. In Yakima County, there were 128 farms with nearly 412,000 acres of woodland in 1959. Eighty-six farms reported forest products cut or sold.

Summer outdoor recreation in the cool, forested highlands is part of the way of life of the Yakima Valley. Many Yakima Indians move by auto to camps in the

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1/ U. S. Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. "Forest Statistics for Yakima County, Washington." (Mimeographed) August 1955.

highlands as the summer heat arrives and collect berries as did their ancestors. Indian livestockmen also move their herds and flocks into the alpine grasslands. Many campers and tourists enjoy the public campgrounds and the hiking in the Goat Rocks Wild Area, Mount Adams Recreation area and other localities of Snoqualmie and Gifford Pinchot National Forests. A special grazing use is permitted to sheep and cattlemen in designated areas of the two national forests.

Wildlife management on Forest Service lands, as well as on the Reservation, is an important type of land use. Yakima County contains large elk herds managed by the State of Washington Game Department and is also a popular area for deer and pheasant hunting. At times the Yakima elk herd reaches maximum size and invades orchard and crop areas in winter. Hunters are, therefore, allowed to kill both bulls and cows to keep the herds in balance with existing feed ranges. Mild winters often result in a build-up of deer herds above the carrying capacity for the ranges. The peaking of the deer herds is apparent in the increased damage to orchards and grain and hay fields throughout the county. During these times the Game Department is busy herding deer from the fields. The mountains and lowlands of Yakima County also hold large populations of pheasants, grouse, chukars, huns and quail. The county is blessed with abundant high lakes and streams which provide excellent sports fishing.

A valuable catch of wild furs is harvested by Indians and others from traplines along valley streams and ponds and in the forests. In the 1962-63 season, 1,952 muskrat, 303 mink, 33 marten, 50 raccoon, 6 skunk, 5 ermine, 14 bobcat and 7 badgers were caught by 31 licensed trappers. 1/

Land Classification and Soils

Only about one-fourth of the Yakima County area is classified as cropland. Where irrigation water is available, class I, II, III and IV land ranging from excellent to fair quality is localized in the lower benchlands of the Yakima River drainage. Sizable districts of class I and II lands under irrigation surround Yakima, Wapato, Toppenish, Sunnyside and Grandview. Higher, thinner soils of class III and IV land lie on the more sloping benchlands around these level areas. Nearly half the county area is in classes V, VI and VII land. These lands are too high for irrigation and too rough for cultivation and are therefore used for grazing and forest growing. Small areas such as the Mount Adams volcanic peak and the Goat Rocks alpine area are in class VIII, a type unsuited for any agricultural use.

Soils of the cropland areas were originally pedocals (high in soluble minerals), some being too alkaline for crops until neutralized by applying heavy amounts of irrigation water. The Yakima soil series covers the lower plains of the Yakima River valley. These are alluvial soils washed from the Cascade Mountains and spread out in level and gently sloping plains by the Yakima River. Top soil material is of fine silty and sandy loams, mixed with fine volcanic ash and is highly productive when irrigated. Yakima loams are irrigable and are one of the most productive soils in the state. Other types of alluvial soils, generally of coarser material, lie along the minor streams. Most of the uplands are thin, rocky soils which dry out rapidly and have limited pasture use. Other than irrigation, the management and tilling of the Yakima alluvial soils are faced with few problems. Some places become alkaline and saline by the seepage and evaporation of irrigation water. The soil is rich in soluble minerals but slightly deficient

1/ State of Washington, Department of Game.

in organic matter and nitrogen. In 1959 Yakima farmers used 31,716 tons of commercial fertilizers mainly on specialty fruit and vegetable crops.

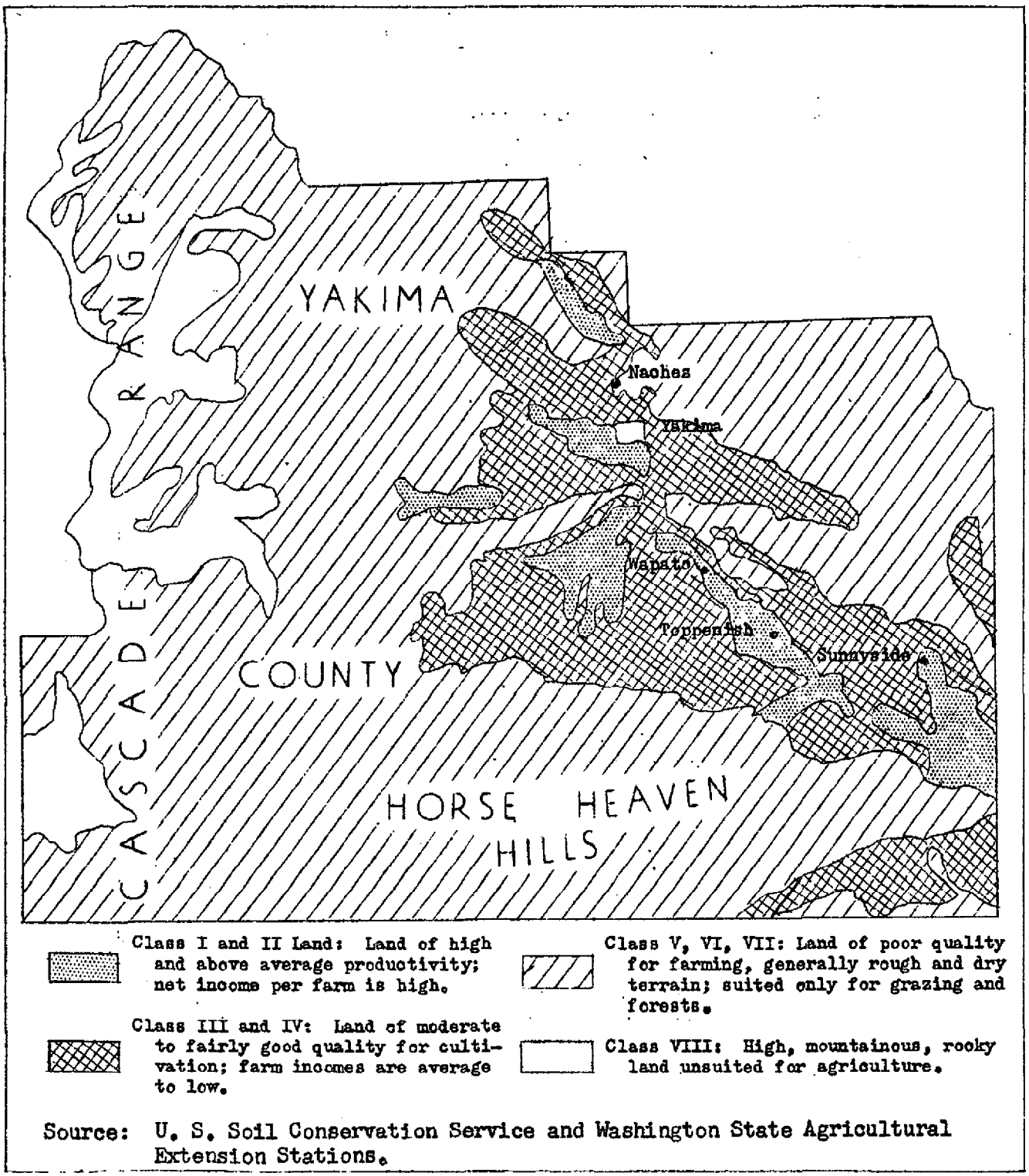

Figure 7. General Quality of the Land in Yakima County.

Table 6. Yakima County's Rank Compared With Other Washington Counties, 1959

Item Compared	Rank	Quantity
General		
Land area	2	2,734,720 acres
Number of farms	1	6,010 farms
Land in farms-percent	11	69.9 percent
Average size of farms	18	313.6 acres
Cropland harvested	6	281,008 acres
Irrigated land in farms	1	296,793 acres
Rural farm population	1	25,972 persons 1/
Total county population	5	145,112 persons 1/
Cash farm income		
Value of all farm products sold.	1	108,679,743 dollars
Value of livestock and livestock products sold	1	32,919,536 dollars
Value of crops sold	1	75,760,207 dollars
Livestock on farms		
All cattle and calves	1	131,507 head
Milk cows	6	12,257 head
Hogs	2	17,197 head
Chickens	9	247,418 birds
Horses and mules	1	3,691 head
Sheep and lambs	1	73,834 head
Dairy and poultry products sold		
Value of dairy products sold	9	3,026,388 dollars
Whole milk sold	8	69,216,289 pounds
Value of poultry products sold	5	2,523,911 dollars
Chickens sold	6	1,204,429 birds
Eggs sold	9	2,861,696 dozen
Important crops harvested		
Fruit trees, nuts, grapes	1	62,784 acres
Field corn	1	42,572 acres
Vegetables	1	23,223 acres
Hops	1	16,986 acres
Sugar beets	1	14,410 acres
Mint for oil	1	12,401 acres
Alfalfa seed	1	9,567 acres
Potatoes	2	4,505 acres
Alfalfa	4	40,437 acres

1/ U. S. Census of Population, 1960.

Source: U. S. Census of Agriculture, 1959.